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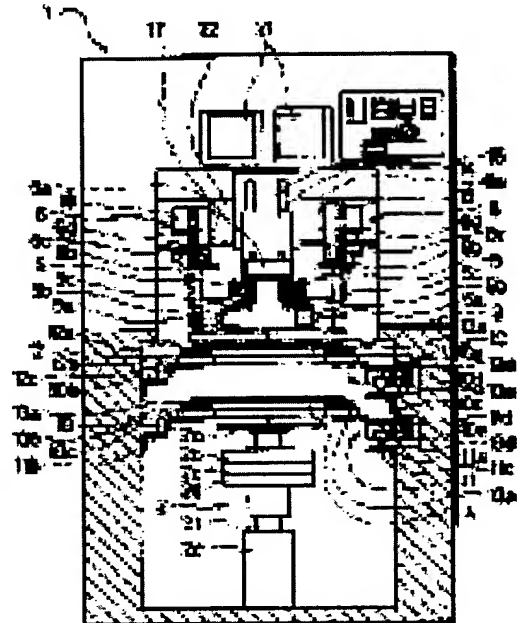
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(54) EXPOSURE DEVICE WITH MASK MATCHING MECHANISM AND MATCHING, EXPOSING, AND CARRYING METHOD FOR WORK

(57)Abstract:

PURPOSE: To accurately match a work a work with a mask film without occupying a working space, to reduce the cause of early deterioration of the interference film of an optical system without opening or closing the upper and lower frames at the matching stage and also without causing the dislocation of the work and mask film, and to enable perpendicular light rays to be irradiated on the work in an exposure stage even if the device is miniaturized.

CONSTITUTION: In an exposure device provided with a matching stage A (not shown), an exposure stage B (not shown), carrying mechanisms 10, 11 arranged in the matching stage and the exposure stage, a light source device 9, and an image pickup means 6 for picking up the image from above a work W (not shown); a retaining mechanism 5 for retaining a work film M (not shown) from above is made up of a suction part 5a of the mask film, a support arm 17 for supporting the suction part so as to be movable in the vertical direction, a first driving device 14 for vertically moving the support arm, a second driving device 15 for vertically moving the first driving device, and a stopper holding part 20 (not shown) for fixedly holding the suction part in the prescribed moving position of the suction part.



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CLAIMS

[Claim(s)]

[Claim 1] The conveyance mechanism in which a work is conveyed between the work and the adjustment stage of a mask film which are characterized by to provide the following, the exposure stage which exposes the work had consistency, and the aforementioned adjustment stage and an exposure stage, the light equipment which carries out optical irradiation of the work which arrived at the exposure stage through optical system, and the aligner which it has in an image pick-up means picture a work and a mask film from the upper part on the aforementioned adjustment stage. Preparing the maintenance mechanism in which a mask film is held from the bottom in the aforementioned adjustment stage, the aforementioned maintenance mechanism is the adsorption section of a mask film. The support arm which supports this adsorption section free [vertical movement]. The 1st driving gear which moves this support arm up and down. The stopper supporter which carries out fixed support of the adsorption section in the 2nd driving gear which moves this 1st driving gear up and down, and the predetermined move position of the aforementioned adsorption section.

[Claim 2] The aforementioned support arm has the guide section which slides the adsorption section in the vertical direction. The end and the other end of an elastic member are connected with the aforementioned adsorption section and a support arm, and the aforementioned adsorption section is energized to a mask film side through an elastic member. the aforementioned stopper supporter The aligner with a mask adjustment mechanism according to claim 1 to which a stopper arm carries out fixed support of the adsorption section which was equipped with the stopper arm mechanical component which drives the stopper arm which appears frequently horizontally, and this stopper arm, and slid along with the aforementioned guide section in a predetermined position.

[Claim 3] The aligner which it has in an image pck-up means picturize the work and the mask film which prepared the conveyance mechanism in which a work is conveyed between the work and the adjustment stage of a mask film characterized by to provide the following, the exposure stage which exposes the work had consistency, and the aforementioned adjustment stage and an exposure stage, and the work which arrived at the exposure stage in the light equipment which carries out optical irradiation through optical system, and the aforementioned adjustment stage from the upper part. The aforementioned conveyance mechanism is the conveyance way of the horizontally parallel upper and lower sides prepared between the adjustment stage and the exposure stage. It has the starting device which operates the 1st and 2nd move tables which hold the 1st and 2nd lower frame boards, respectively, and move along with each of these conveyances way. While preparing the alignment table which goes up exceeding both the conveyances path from the lower part of a conveyance path in the aforementioned adjustment stage and preparing the perpendicular conveyance table which goes up exceeding both the conveyances path from the lower part of a conveyance path in the aforementioned exposure stage It is the installation board with which the upper light transmission frame board which coalesces in the above 1st and the bottom frame board of the ** 2nd, and forms a vacuum frame is formed, and the aforementioned move table lays a lower frame board. The positioning guide of the lower frame board formed in the predetermined position of this installation board.

[Claim 4] The aforementioned positioning guide is an aligner with a mask adjustment mechanism according to claim 3 to which the aforementioned rotation roller contacts each side of the lower frame board which forms a rotation roller in the predetermined position of an installation board, and is laid in the aforementioned installation board.

[Claim 5] The image pck-up means prepared in the aforementioned adjustment stage is equipped with the lighting system which irradiates the focal position of the image pck-up camera of one side and another side, and both the image pck-up camera. the aforementioned image pck-up camera It is supported through supporter material. the aforementioned supporter material It is prepared in the slide section prepared free [movement] along with the longitudinal direction of a move arm. the aforementioned move arm The base is established in the level slot which intersects perpendicularly with the aforementioned longitudinal direction possible [movement]. the aforementioned lighting system The aligner with a mask adjustment mechanism according to claim 1 or 3 which is prepared free [rise and fall] in the predetermined position of the aforementioned supporter material, and irradiates the positioning mark of a work and a mask film by the move soffit of a lighting system at the time of the

image pick-up of the aforementioned image pick-up camera.

[Claim 6] The lower frame board which lays the aforementioned work is the aligner with a mask adjustment mechanism according to claim 1, 3, or 5 which prepared the salient which contacts the side of one side of a work in the predetermined position, and prepared the irradiation equipment of the visible parallel light which carries out pinpoint irradiation of the positioning mark position of a work at the aforementioned image pick-up means side.

[Claim 7] The light equipment of the aforementioned aligner is formed in housing contiguous to an exposure stage. in the aforementioned housing the reflecting mirror which reflects the irradiation light from the electric-discharge lamp of light equipment in the predetermined direction while preparing the cooling system which has a refrigerant radiator — and Optical system, such as a fly eye lens which adjusts the illuminance of light, is formed. in the aforementioned exposure stage The parabolic reflector which reflects perpendicular parallel light in the work which arrives at an exposed position is prepared. the center position of the aforementioned light equipment the right and left from the center position of the right-and-left cross direction of an aligner — the 1st reflecting mirror reflected at a predetermined angle the irradiation light of the perpendicular direction from the aforementioned electric-discharge lamp by being arranged in the position shifted to either An aligner with a mask adjustment mechanism given in the claims 1, 3, 5, and 6 which reflect the reflected light in a work side from the vertical plane which is parallel to the end side of a work, and is constituted along with the optical axis of the irradiation light of a electric-discharge lamp.

[Claim 8] At one [which conveys a lower frame board along the conveyance way which height was changed horizontally and prepared] move edge of a move table While making the unilateral edge of a work contact the 1st process which the upper part is made to carry out separation alienation from a move table, and lays the bottom frame board of the above on an alignment table, and the salient prepared in the one-side side of the bottom frame board of the above with elevation of an alignment table The 2nd process which doubles the positioning mark of a work with the visible parallel ray by which pinpoint irradiation is carried out, and carries out work installation on a lower frame board, While picturizing the positioning mark of the 3rd process which carries out temporary positioning of the positioning mark of a mask film according to the aforementioned visible parallel ray, and lays a mask film on a work, and the aforementioned work and a mask film by the image pick-up means Descend a maintenance mechanism from the upper part of the aforementioned mask film, and

adsorption maintenance of the mask film is carried out. The 4th process which raise a maintenance mechanism, a mask film is made to estrange from a work, and an alignment table is operated in X on the level surface, Y, and the direction of theta based on the positional information of the aforementioned positioning mark, and does adjustment work, The adjustment method of the work which consists of the 5th process which fixed maintenance of a work and the mask film is carried out [process] by the fixed means at a lower frame in the state where dropped the aforementioned maintenance mechanism and the mask film was made to contact a work, and the suction operation of a maintenance mechanism is canceled [process], and raises a maintenance mechanism.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the aligner which exposes one side of the work of a sheet, and relates to the exposure method at adjustment of an aligner with a mask adjustment mechanism and a work equipped with the adjustment mechanism of the mask film which formed the exposure pattern especially, conveyance, and a row.

[0002]

[Description of the Prior Art] Generally, the work which prints the exposure pattern of a request of a mask film on a work was done in the position divided into adjustment work and exposure work. That is, as drawing 14 shows, with Work W and the adjustment equipment 67 of the mask film M, the positioning mark of Work W and the mask film M is picturized with the image pck-up cameras 68 and 68, and alignment position work is done through the monitor 69, the alignment table, etc. Then, the work had consistency and a mask film are once contained to the stowage 66 of stocker equipment 65, this stocker equipment 65 is moved, and it is exposing by the aligner 60.

[0003] The composition of the vacuum frame which pinches Work W fixes the end side of the upper light transmission frame board 61 to revolve with a ginglymus 63 etc. to the end side of the lower frame board 62, and the aforementioned aligner 60 is constituted so that the upper light transmission frame board 61 may rotate, open and close on the basis of the end side. The above top light transmission frame board 61 is formed in the shape of a frame, and has upper translucent plate 61a. And the air of

above top translucent plate 61a and the space surrounded with seal rubber etc. is attracted, Work W is reached, to both the frame boards 61 and 62, vacuum adsorption is carried out and the mask film M is pinched. In the state where it was pinched with the up-and-down frame boards 61 and 62, Work W is sent to the exposure stage of an aligner, and is exposed.

[0004] Moreover, there are some which are equipped with an adjustment mechanism depending on the composition of an aligner. An aligner 70 is an adjustment stage position, and the alignment table 71 is formed, and as drawing 15 shows, it is constituted so that a mask film pickup can be carried out on a work from the lower part of a work while the image pick-up cameras 72 and 72 are installed in a lower part side. Therefore, the work W exposed needs to drill a round hole in a predetermined position. Furthermore, it is crossed to an exposure stage from an adjustment stage, an aligner 70 is horizontal, and it prepares in the conveyance ways 75 and 75 prepared up and down respectively free [both-way movement of the upper light transmission frame boards 74 and 74], and as an imaginary line shows through the attachment rotation sections 74a and 74a, it is constituted free [rotation]. Moreover, one side is arranged at an adjustment stage side, these top light transmission frame boards 74 and 74 and the lower frame boards 73 and 73 which pinch Work W by one coalesce in the upper light transmission frame board 61 at an exposure stage side, and another side is arranged.

[0005] And the mask film is attached in the translucent plate of each up light transmission frame board 74. Furthermore, on the exposure stage, since the distance of the UV irradiation from a reflecting mirror to a work differs, two actinometers 77 and 77 are installed, and even if the positions of the work W of the upper and lower sides of the addition quantity of light of this actinometer differ, it is considering as the composition which controls the light source to become the almost same numeric value.

[0006] And housing for cooling which adjoins an exposure stage and cools a work side etc. is prepared, and a cooling system 77, cooling-fan 77a, etc. are installed in this housing for cooling. Moreover, cooling housing is adjoined, housing for the light sources is prepared, optical system, such as light equipment 78 fly eye lens 78a and reflecting mirror 78b, is formed in this housing for the light sources, and the light from light equipment 78 is irradiated at parabolic-reflector 78c which reflects perpendicular light in Work W above [in the aforementioned exposure stage]. In addition, housing for cooling is prepared between an exposure stage and alder JINGU for the light sources, because it is necessary to cool that it is necessary to separate predetermined

distance from light equipment when [required] irradiating perpendicular light at a work, light equipment, a work side, etc.

[0007]

[Problem(s) to be Solved by the Invention] However, the following troubles existed in the above-mentioned aligner.

****** As for that into which an aligner and adjustment equipment are divided, only the part of adjustment equipment and stocker equipment will take a workspace. Moreover, when a work and a mask film were moved with stocker equipment, it became the cause by which dust adhered to a work and a mask film. [finishing / adjustment] Furthermore, it also became the cause by which position gap of a work and a mask film took place during conveyance.

[0008] ****** Since what equips the adjustment stage position of an aligner with an image pck-up means needed the work which makes hole down the predetermined position of a work since the image pck-up means is arranged under the work, it increased the routing and needed the equipment accompanying it. Moreover, when a lighting beam of light did not enter when small, but the drilled round hole was large, it was inconvenient on the design of the picture of a circuit etc. Furthermore, since the drilled round hole was formed with the drill, the barricade occurred, and it is that this barricade reflects irregularly the light of a lighting beam of light, and could not read the positioning mark of a mask film with an image pck-up means, but had the case where adjustment work could not be performed.

[0009] ****** Since there was work whose composition of an aligner opens or blockades an upper light transmission frame board and a lower frame board on an adjustment stage (the thing of drawing 15 is the aligner carrying-in section), the opening-and-closing work of the frame of the upper and lower sides took time, and the throughput of a work declined.

[0010] ****** In how to place [for temporary positioning to be unable to do an aligner equipped with an alignment table, and for the position of the positioning mark of the work laid in a lower frame board and the position of the positioning mark of a mask film not to double it, in order that the upper light transmission frame board which prepared the mask film may perform an opening-and-closing operation by using an end side as a rotation pivot, but] ******** and a work, the adjustment work by the image pck-up means was not able to do.

[0011] ****** Although a lower frame board and an upper light transmission frame board will coalesce the work on a lower frame board on an alignment table after doing adjustment work, and an aligner equipped with an adjustment stage will pinch a work

and a mask film, when carrying out vacuum adsorption of a work and the mask film with an up-and-down frame, position gap was produced in many cases and the exposure work of a work took time by redoing adjustment work.

[0012] ** Although the light equipment of an aligner could not irradiate perpendicular light in a work side unless it had the predetermined distance detached building from the work irradiation side to the electric-discharge lamp, when housing for cooling was prepared between an exposure stage and light equipment, the whole aligner enlarged it. Moreover, the reflecting mirror [the electric-discharge lamp and the reflecting mirror could remove neither the luminescence heat which will be emitted from a electric-discharge lamp if housing for cooling is prepared apart from housing for the light sources, nor indoor humidity proper, and / aging which produces un-arranging, such as defluxion of an interference film etc., under the influence] rashly although the interference film, the vacuum evaporatio film, etc. were prepared in the request direction so that optical irradiation could be performed appropriately

[0013] ** Although light equipment was controlled so that the addition quantity of light became the same with an actinometer since the distance from the light source differed when a work was exposed on an exposure stage, when it could do, it was desirable for the distance of a work to the light source to be always fixed, and composition of the equipment which can realize the composition was desired.

[0014] This invention, without having been originated that the above-mentioned trouble should be solved and taking a workspace Moreover, without making alignment of a work and a mask film exactly and carrying out the opening-and-closing operation of an up-and-down frame on an adjustment stage And there is no position gap of the work after adjustment work and a mask film, and the cause of carrying out early degradation of the interference film of optical system, such as humidity and luminescence heat of a electric-discharge lamp, can be decreased further. It aims at providing with the exposure method adjustment of the aligner with a mask adjustment mechanism and work which can irradiate perpendicular light, conveyance, and a row to the work of an exposure stage, without enlarging equipment.

[0015]

[Means for Solving the Problem] In order to solve the aforementioned technical problem, this invention A work and the adjustment stage of a mask film, The conveyance mechanism in which a work is conveyed between the exposure stage which exposes the work had consistency, and the aforementioned adjustment stage and an exposure stage, The light equipment which carries out optical irradiation of the work which arrived at the exposure stage through optical system, It is the aligner

which equips the aforementioned adjustment stage with an image pick-up means to picturize a work and a mask film from the upper part. The maintenance mechanism in which a mask film is held from the bottom is prepared in the aforementioned adjustment stage. the aforementioned maintenance mechanism The support arm which supports the adsorption section and this adsorption section of a mask film free [vertical movement], It constituted from the 1st driving gear which moves this support arm up and down, the 2nd driving gear which moves this 1st driving gear up and down, and a predetermined move position of the aforementioned adsorption section as an aligner with a mask adjustment mechanism equipped with the stopper supporter which carries out fixed support of the adsorption section.

[0016] Moreover, the aforementioned support arm has the guide section which slides the adsorption section in the vertical direction. The end and the other end of an elastic member are connected with the aforementioned adsorption section and a support arm, and the aforementioned adsorption section is energized to a mask film side through an elastic member. the aforementioned stopper supporter It has the stopper arm mechanical component which drives the stopper arm which appears frequently horizontally, and this stopper arm, and the adsorption section which slid along with the aforementioned guide section is not cared about with a predetermined position as composition in which a stopper arm carries out fixed support.

[0017] Furthermore, while preparing the alignment table which goes up exceeding both the conveyances path from the lower part of a conveyance path in the aforementioned adjustment stage and preparing the perpendicular conveyance table which goes up exceeding both the conveyances path from the lower part of a conveyance path in the aforementioned exposure stage The upper light transmission frame board which coalesces in the above 1st and the bottom frame board of the ** 2nd, and forms a vacuum frame is formed. the aforementioned move table It constituted as an aligner with a mask adjustment mechanism equipped with the positioning rotation roller of the installation board which lays a lower frame board, and the lower frame board formed in the predetermined position of this installation board.

[0018] Moreover, the aforementioned move table is equipped with the installation board which lays a lower frame board, and the fixed guide prepared in the predetermined position of this installation board, and both the aforementioned lower frame board is good for the side position also as composition of a rotation roller prepared so that surface of revolution might project at least.

[0019] And the image pick-up means prepared in the aforementioned adjustment stage It has the lighting system which irradiates the focal position of the image pick-up

camera of one side and another side, and both the image pick-up camera. the aforementioned image pick-up camera It is supported through supporter material. the aforementioned supporter material It is prepared in the slide section prepared free [movement] along with the longitudinal direction of a move arm. the aforementioned move arm The base is established in the level slot which intersects perpendicularly with the aforementioned longitudinal direction possible [movement]. the aforementioned lighting system It was prepared free [rise and fall] in the predetermined position of the aforementioned supporter material, and constituted as the aforementioned aligner with a mask adjustment mechanism which irradiates the positioning mark of a work and a mask film by the move soffit of a lighting system at the time of the image pick-up of the aforementioned image pick-up camera.

[0020] Moreover, the lower frame board which lays a work was considered as the composition which prepared the salient which contacts the side of one side of a work in the predetermined position, and prepared the irradiation equipment of the visible parallel light which carries out pinpoint irradiation of the positioning mark position of a work at the aforementioned image pick-up means side.

[0021] Furthermore, while preparing the cooling system which has a refrigerant radiator in housing for the light sources which prepared the parabolic reflector which reflects perpendicular light in the work which arrives at an exposed position in the aforementioned exposure stage, and was adjoined and prepared in the aforementioned exposure stage the center position of the aforementioned light equipment -- the right and left from the center position of the right-and-left cross direction of an aligner -- the reflecting mirror reflected at a predetermined angle the irradiation light of the perpendicular direction from the aforementioned electric-discharge lamp by arranging in the position shifted to either It was parallel to the end side of a work, and considered as the composition which reflects the reflected light in a work side from the vertical plane formed along with the optical axis of the irradiation light of a electric-discharge lamp.

[0022] And it is the 1st process which is one [which conveys a lower frame board along the conveyance way which height was changed horizontally and prepared as the adjustment method of a work and a mask film] move edge of a move table, and the upper part is made to carry out separation alienation from a move table, and lays the bottom frame board of the above on an alignment table with elevation of an alignment table, and [0023]. While making the unilateral edge of a work contact the salient prepared in the one-side side of the bottom frame board of the above The 2nd process which doubles the positioning mark of a work with the visible parallel ray by

which pinpoint irradiation is carried out, and carries out work installation on a lower frame board, While picturizing the positioning mark of the 3rd process which carries out temporary positioning of the positioning mark of a mask film according to the aforementioned visible parallel ray, and lays a mask film on a work, and the aforementioned work and a mask film by the image pick-up means Descend a maintenance mechanism from the upper part of the aforementioned mask film, and adsorption maintenance of the mask film is carried out. The 4th process which raise the maintenance mechanism in which the mask film is held, a mask film is made to estrange from a work, and an alignment table is operated in X on the level surface, Y, and the direction of theta based on the positional information of the aforementioned positioning mark, and does adjustment work, and [0024] Fixed maintenance of a work and the mask film was carried out by the fixed means at the lower frame in the state where dropped the aforementioned maintenance mechanism and the mask film was made to contact a work, and it constituted from the 5th process which the suction operation of a maintenance mechanism is canceled [process] and raises a maintenance mechanism.

[0025] Moreover, it is the 1st process a process makes [the upper light-transmission frame board is made to estrange in the upper part and a board is installed in elevation of a perpendicular conveyance table up from the move table with the lower frame board which is the move edge of another side of the move table which conveys a lower frame board along the conveyance way which height was changed horizontally and was prepared as the exposure method of a work, and held the work had consistency and the mask film] carry out contact coalesce, and [0026 Optical irradiation was carried out through optical system at the aforementioned work from light equipment, and it constituted from the 3rd process which carries out installation support at the move table which is standing by the lower frame board with descent of a perpendicular conveyance table by separating the 2nd process which exposes the predetermined pattern of a mask film to a work, and the bottom frame board of the above from an upper light transmission frame board.

[0027] furthermore — as the conveyance method of a work Both-way movement of the 2 move table is carried out. the [the 1st which moves along the conveyance way established in two steps of upper and lower sides between an adjustment stage and an exposure stage, and] — the [the 1st and] — the 1st process which makes another side of a lower frame both arrive at the perpendicular conveyance table side of an exposure stage as if for one side of each lower frame which is carrying out installation support to be made to arrive at 2 move table at the alignment table side of an

adjustment stage, and [0028] It is made to go up. an adjustment stage — elevation of an alignment table — the 1st move table to a lower frame — alienation — While adjusting a work and a mask film by the operation of an alignment table through the maintenance mechanism of an image pick-up means and a mask film etc. and carrying out fixed maintenance of a work and the mask film through a fixed means on a lower frame Elevation of a perpendicular conveyance table is made to carry out elevation alienation of the work had consistency from the 2nd move table on an exposure stage with the lower frame board which carries out fixed maintenance. A work and a mask film are made in between the upper light transmission frame board installed up, contact coalesce of the lower frame board is carried out, vacuum adsorption is carried out, and it is exposure work The 2nd process and [0029] While the lower frame which carries out fixed maintenance of the work had consistency and the mask film with descent of an alignment table descends and installation support is carried out on an adjustment stage at the 1st move table which is standing by The 3rd process which cancels vacuum adsorption of a vacuum frame, and the lower frame which carries out fixed maintenance descends, and carries out installation support of an exposed work and the mask film with descent of a perpendicular conveyance table on an exposure stage at the 2nd move table which is standing by, While conveying the 1st move table on the exposure stage from the adjustment stage along the conveyance way of the aforementioned upper and lower sides, the 2nd move table consisted of the 4th process conveyed on an adjustment stage from an exposure stage.

[0030]

[Function] Since this invention was constituted as mentioned above, it has the following operations.

(1) while contacting the mask film which the adsorption section which boiled the support arm and was prepared free [vertical movement] carries out predetermined distance descent of the maintenance mechanism in which a mask film is held, with the 1st driving gear, and is laid on the work, it is the position which carried out vacuum adsorption of the mask film, and a stopper supporter carries out fixed support of the adsorption section And even if a work moves horizontally by the operation of an alignment table, it is made to drive the whole support arm with the 1st driving gear to the position which does not have influence in the exposure pattern of a mask film, and a mask film is raised.

[0031] (2) Since the aforementioned adsorption section is constituted from energization force of an elastic member so that it may always be energized at a mask film side, when a support arm is descended with the 1st driving gear, the adsorption

section contacts certainly with a mask film.

[0032] (3) The move table horizontally conveyed by turns along an up-and-down conveyance way has prepared the positioning guide in the predetermined position of an installation board. Therefore, if each alignment table and perpendicular conveyance table installed in the adjustment stage and exposure stage which are the move edge of one side and another side go up across an up-and-down conveyance way, the lower frame currently supported in the positioning guide of a move table will dissociate from a move table, will be laid in each table, and will go up. Moreover, if each table which is laying the lower frame descends, a lower frame will be guided at the positioning guide of a standby ***** move table, and installation support will be carried out on a move table.

[0033] (4) Moreover, if the aforementioned positioning guide is the composition of a rotation roller, in case a lower frame will follow on vertical movement of each table and will be separated or supported from a move table, each side of a lower frame is guided because a rotation roller rotates.

[0034] (5) The focal position of an image pick-up camera which the supporter material of an image pick-up camera established in the support arm along with the longitudinal direction of a move arm that it can move since the end face of a move arm was able to move to a level slot can move the image pick-up means prepared in the adjustment stage to a request position. And since the aforementioned supporter material is prepared free [vertical movement of an annular lighting system], when picturizing the positioning mark of a work and a mask film with the aforementioned image pick-up camera, a lighting system can irradiate lighting light by the move soffit.

[0035] (6) A work doubles and lays at least one side of the positioning mark of a work in the visible parallel light which carries out pinpoint irradiation of the predetermined position of a lower frame while end-face doubling of the end side is carried out to the salient prepared in each lower frame board and it installs it in it. And in case a mask film is laid on a work, it becomes possible to carry out temporary positioning by doubling the positioning mark of a mask film and putting the pinpoint irradiation position of the aforementioned visible parallel light on a mark.

[0036] (7) Since the reflecting mirror which reflects the light irradiated from the electric-discharge lamp of light equipment in the predetermined direction, the fly eye lens which adjusts the illuminance of light are prepared in housing of the light equipment adjoined and formed in the exposure stage while preparing a cooling system, the humidity in housing and the luminescence heat from a electric-discharge lamp are removed preferentially. Moreover, while forming light equipment in housing for the light

sources contiguous to an exposure stage and shifting and installing light equipment in the method of what [right-and-left] from the center position of the right-and-left cross direction of an aligner It is parallel to the unilateral edge of a work, and since the 1st reflecting mirror reflects the irradiation light from light equipment in a predetermined angle at a work side, the proper distance which irradiates perpendicular parallel light is securable for a work from the vertical plane constituted along with the optical axis of the irradiation light of the perpendicular direction from light equipment. [0037] (8) It is one [which conveys a lower frame board along the conveyance way which height was changed horizontally and was first prepared as the adjustment method of a work] move edge of a move table, and with elevation of an alignment table, make the upper part carry out separation alienation from a move table, and lay the bottom frame board of the above on an alignment table. And while making the unilateral edge of a work contact the salient prepared in the one-side side of the bottom frame board of the above, the positioning mark of a work is doubled with the visible parallel ray by which pinpoint irradiation is carried out, and work installation is carried out on a lower frame board.

[0038] Then, while carrying out temporary positioning of the positioning mark of a mask film according to the aforementioned visible parallel ray, laying a mask film on a work and picturizing the positioning mark of the aforementioned work and a mask film by the image pick-up means Descend a maintenance mechanism from the upper part of the aforementioned mask film, and adsorption maintenance of the mask film is carried out. Raise a maintenance mechanism, a mask film is made to estrange from a work, an alignment table is operated in X on the level surface, Y, and the direction of theta based on the positional information of the aforementioned positioning mark, and adjustment work is done. Furthermore, adjustment work is ended by carrying out fixed maintenance of a work and the mask film by the fixed means at a lower frame in the state where dropped the aforementioned maintenance mechanism and the mask film was made to contact a work, canceling the suction operation of a maintenance mechanism, and raising a maintenance mechanism.

[0039] (9) Make the upper light transmission frame board which the upper part is made to estrange to a rise of a perpendicular conveyance table, and is installed in it up from the move table with the lower frame board supported as the exposure method of a work by the move table conveyed on the exposure stage carry out contact coalesce. And optical irradiation is carried out through optical system at the aforementioned work from light equipment, and the predetermined pattern of a mask film is exposed to a work. Then, the bottom frame board of the above is separated from an upper light

transmission frame board, and a lower frame board is performed on the move table which is standing by by carrying out installation support with descent of a perpendicular conveyance table.

[0040] (10) the [the 1st which moves as the work conveyance method along the conveyance way established in two steps of upper and lower sides between the adjustment stage and the exposure stage, and] — both-way movement is carried out in 2 move table — making — the [the 1st and] — making another side of a lower frame both arrive at the perpendicular conveyance table side of an exposure stage as if for one side of each lower frame which is carrying out installation support to be made to arrive at 2 move table at the alignment table side of an adjustment

[0041] It is made to go up. the next — an adjustment stage — a rise of an alignment table — the 1st move table to a lower frame — alienation — While adjusting a work and a mask film by the operation of an alignment table through the maintenance mechanism of an image pick-up means and a mask film etc. and carrying out fixed maintenance of a work and the mask film through a fixed means on a lower frame A rise of a perpendicular conveyance table is made to carry out rise alienation of the work had consistency from the 2nd move table on an exposure stage with the lower frame board which carries out fixed maintenance. A work and a mask film are made in between the upper light transmission frame board installed up, contact coalesce of the lower frame board is carried out, vacuum adsorption is carried out, and exposure work is done.

[0042] Furthermore, while the lower frame which carries out fixed maintenance of the work had consistency and the mask film with descent of an alignment table descends and installation support is carried out on an adjustment stage at the 1st move table which is standing by, in an exposure stage, vacuum adsorption of a vacuum frame is canceled, with descent of a perpendicular conveyance table, the lower frame carry out fixed maintenance descends an exposed work and a mask film, and installation support is carried out to the 2nd move table are standing by. And while conveying the 1st move table on an exposure stage from an adjustment stage along the conveyance way of the aforementioned upper and lower sides, the 2nd move table is conveyed on the adjustment stage from the exposure stage.

[0043]

[Example] Hereafter, one example of this invention is explained with reference to a drawing. The front view with which drawing 1 made the cross section the part which shows the important section of an aligner, and drawing 2 are the perspective diagram showing the whole aligner. Drawing 3 is the principle view showing the important

section of an aligner.

[0044] The aligner 1 consists of housing C for the light sources adjoined and prepared in the prepared exposure stage B contiguous to the adjustment stage A and this adjustment stage A, and this exposure stage B, as drawing 3 shows.

[0045] The aforementioned adjustment stage A is equipped with an image pick-up means 6 to picturize the positioning mark of the alignment table 2 which does the adjustment work of a work, the maintenance mechanism 5 of the mask film M established above this alignment table 2, and the Work W and the alignment film M etc. The upper light transmission frame board 7, the perpendicular conveyance table 8 prepared under this upper light transmission frame board 7, and the work W prepared in the above top light transmission frame board 7 bottom are equipped with 9f of parabolic reflectors which reflect perpendicular light on the aforementioned exposure stage B. In aforementioned alder JINGU C for the light sources, it has light equipment 9, the cooling system 16, a roll fan, the refrigerant radiator 18, etc. Moreover, between the aforementioned adjustment stage A and the exposure stage B, the conveyance mechanisms 10 and 11 in which the move tables 12 and 13 which carry out installation support of the lower frame boards 3 and 4 are conveyed are established.

[0046] As drawing 1 shows, the aforementioned alignment table 2 Installation table 2a which lays the lower frame boards 3 and 4, and this installation table 2a Horizontal X mechanical-component 2b which moves to ** on the other hand, Y mechanical-component 2c which moves the X mechanical-component 2b in the direction which intersects perpendicularly with the driving direction of this X mechanical-component 2b, It consists of 2d of theta mechanical components which move this Y mechanical-component 2c in the direction which rotates the surroundings of the direction of a perpendicular axis, and 2f of cylinder shafts and cylinder mechanical-component 2e which carries out the rise descent drive of the aforementioned installation table 2a side.

[0047] And if the aforementioned cylinder mechanical-component 2e operates 2f of cylinder shafts in the extension direction, it is considering as the composition whose installation table 2a etc. goes up, makes above carry out separation alienation of the lower frame board 3 (4) mentioned later from each move table 12 (13), and lays the lower frame board 3 (4) on installation table 2a. In addition, when laying Work W on the lower frame board 3 and 4, installation table 2a of the aforementioned alignment table 2 is raised, and the lower frame board 3 (4) is performed to the position shown by the imaginary line of drawing 1 in the position which carried out the elevation drive. Moreover, when doing the adjustment work of Work W and the mask film M, it is

considering as the composition performed in the position which raised installation table 2a similarly.

[0048] As drawing 1 shows, the aforementioned image pck-up means 6 provides the image pck-up cameras 6a and 6a in the nose-of-cam side of each move arm 19 and 19 through Supporters 6d and 6d. These supporters 6d and 6d are formed free [sliding] along the slide slots 19a and 19a established in the longitudinal direction of the aforementioned move arms 19 and 19. moreover, the respectively annular floodlights 6b and 6b as a lighting system resemble an aforementioned supporters [6d and 6d] predetermined position free [vertical movement], and it is prepared in it, and is arranged in the position surrounding the center of the aforementioned image pck-up cameras 6a and 6a Furthermore, the irradiation equipments 6c and 6c of a visible parallel ray are attached in the aforementioned supporters [6d and 6d] predetermined position at the predetermined angle. In addition, the aforementioned move arms 19 and 19 are formed in right and left free [movement] along with the sliding mechanism 22 which prepared the end face side in the main part side.

[0049] As drawing 1 shows, the aforementioned irradiation equipments 6c and 6c are set up so that pinpoint irradiation of the position of the positioning mark of the work W may be carried out by the visible parallel ray when the work W on the lower frame board 3 (4) arrives at an elevation edge by elevation of the alignment table 2.

Moreover, as drawing 5 shows, the lower frame board 3 (4) equips the one-side close-attendants side with Salients 3a and 3a (4a, 4a), and is considering them as the composition which can do end-face doubling in contact with the end side of Work W. In case they picturize the positioning mark of the mask film M and Work W so that the image pck-up state of the image pck-up cameras 6a and 6a may become good, the aforementioned annular floodlights 6b and 6b descend caudad, they are near the mask film M, and they are irradiating a yellow lighting light so that each positioning mark may arrange in annular.

[0050] In addition, by moving the move arms 19 and 19 and Supporters 6d and 6d, since the image pck-up cameras 6a and 6a can move the focal position of the image pck-up cameras 6a and 6a, even if the sizes of Work W differ, they can respond.

[0051] As drawing 1 and drawing 4 show, the maintenance mechanism 5 of a mask film prepared piece of maintenance 5b in slide section of 5d of attachment sections prepared in support arm 17 5c free [sliding], and provides adsorption section 5a which carries out vacuum adsorption of the mask film M at the soffit side of this piece of maintenance 5b. moreover, drawing 4 shows -- as -- the aforementioned piece of maintenance 5b -- a upper-limit side -- horizontal -- a protrusion -- the bottom --

the piece of support — 5f is attached And spring 5e is prepared over 5f side of the aforementioned support pieces, and the soffit side of the 5d of the aforementioned attachment sections, and the aforementioned adsorption section 5a is constituted so that it may always be energized at the mask film M side.

[0052] Furthermore, as drawing 4 shows, the upper-limit side of the 5d of the aforementioned attachment sections is equipped with the piece of a protrusion which projects horizontally, and bolt 5g is stopped through a nut by this piece of a protrusion. The aforementioned bolt 5g, it is inserted in the slot prepared in the predetermined position of the 5f of the aforementioned support pieces, and the bolt head is constituted so that the base side of the 5f of the aforementioned support pieces may be contacted. Since the aforementioned adsorption section 5a is always energized this bolt 5g at the mask film M side, it is for performing a soffit setup of adsorption section 5a in a predetermined position.

[0053] As drawing 4 shows, the stopper supporter 20 is attached in the support arm 17 at the back side of piece of maintenance 5b which prepared the aforementioned adsorption section 5a. This stopper supporter 20 has stopper arm 20a prepared horizontally free [frequent appearance] and stopper arm mechanical-component 20b which drives this stopper arm 20a.

[0054] Furthermore, as drawing 1 shows, the aforementioned support arm 17 is supported by the 1st driving gear 14 free [vertical movement] by the cylinder style etc., and the 1st driving gear 14 of the above is supported by the 2nd driving gear 15 free [vertical movement]. And the 2nd driving gear 15 of the above moves the 1st driving gear 14 up and down by big stroke, and it consists of move soffits so that adsorption section 5a of the support arm 17 can contact the mask film M. Moreover, the 1st driving gear 14 of the above is considered as the composition which moves the support arm 17 up and down by small stroke, after it operates with the 2nd driving gear and adsorption section 5a of the support arm 17 carries out adsorption maintenance of the mask film M.

[0055] Next, the conveyance mechanisms 10 and 11 are explained. the [the 1st which moves along with the linear guides 10a and 11a and the monotonous guides 10b and 11b which were prepared as a conveyance way in which the conveyance mechanisms 10 and 11 were formed over between the adjustment stage A and the exposure stage B as drawing 1 and drawing 5 showed, and these linear guides 10a and 11a and the monotonous guides 10b and 11b, and] -- it has starting device 10A of 2 move tables 12 and 13 timing-belt 10e over which the pulleys 10f and 10g which prepared the aforementioned starting device 10A in the adjustment stage A and exposure stage B

side, respectively, and these pulleys 10f and 10g were built, and one pulley (drawing exposure stage side) 10g — it has 10h of drive motors formed in the side [0056] Moreover, as drawing 5 shows the aforementioned move table 12 (13), it has installation base 12b (13b) of a KO typeface, the wheels 12c and 12c (13c, 13c) prepared in the end side of this installation base, and the slide attaching parts 12d and 12d (13d, 13d) prepared in the other end side, and positioning roller 12a (13a) is prepared in the installation base upper surface. The installation position of these positioning roller 12a (13a) corresponds to the upper light transmission frame board 7 formed in the exposure stage B, and is established in the position where each lower frames 12 and 13 which carried out installation support can constitute a vacuum frame in positioning roller 12a (13a) in contact with the proper position of the upper light transmission frame board 7.

[0057] As drawing 5 shows, the wheels 12c and 12c (13c, 13c) of the aforementioned move table 12 (13) run a monotonous guide 10b (11b) top, and the slide attaching parts 12d and 12d (13d, 13d) are considering them as the composition which slides along with the aforementioned linear guide 10a (11a), and the aforementioned positioning roller 12a (13a) — the position (a drawing six places) of the lower frame board 3 (4) which contacts each side at least — attachment — it fixes by the member 12a2 (13a2) — having — this attachment — the rotation roller 12a1 (13a1) is formed in the member 12a2 (13a2) free [rotation] Furthermore, the portion surrounded by the inside maximum projection position of the rotation roller 12a1 (13a1) of each above is constituted so that each side of the lower frame board 3 (4) may contact and may be supported.

[0058] furthermore, drawing 3 and drawing 5 show — as — the [the 1st and] — 2 move table 12 (13) forms the members 10d and 10d (11e, 11e) with ruble in the 12d [of the slide attaching part], and 12d (d [13], 13d) side, and stops them in the predetermined position of the aforementioned timing-belt 10e

[0059] Therefore, the lower frame board 3 (4) currently supported by positioning roller 12a (13a) of the move table 12 (13) Guide the circumferential side at the positioning roller 12a (13a), and it separates into installation board 12b (13b). It is supported free [installation], and with the rise of installation table 2a of said alignment table 2, and rise-and-fall table 8a of the perpendicular conveyance table 8 mentioned later, it dissociates from the move table 12 (13), and adjustment work and exposure work are done. Moreover, after each work, with descent of installation table 2a and rise-and-fall table 8a, the lower frame board 3 (4) is guided at positioning roller 12a (13a) of the move table 12 (13), and installation support is carried out at installation

board 12b (13b).

[0060] Moreover, as drawing 3 shows, the move table 12 of the adjustment stage A and the move table 13 of the exposure stage B are making timing-belt 10e drive, by turns, hold Work W and the mask film M to the lower frame boards 3 and 4, and move between the adjustment stage A and the exposure stage B to them.

[0061] Below, it attaches and explains to the composition in the exposure stage B. As drawing 3 shows, fixed installation of the upper light transmission frame board 7 which carries out contact coalesce with the lower frame boards 3 and 4, and serves as a vacuum frame is carried out on the exposure stage B. Besides, the frames 7b and 7g of the upper and lower sides of translucent plate 7a are pinching the composition of the light transmission frame board 7 free [opening and closing]. That is, as drawing 6 shows, the one side of them is connected with 7g of lower frames by Hinges 7c and 7c, upper frame 7b is stopped to the aforementioned hinge [7] and 7c and other side side which counter, and Handles 7e and 7e are formed. And Cylinders 7f and 7f are formed in other both sides.

[0062] therefore -- if it stops, and Handles 7e and 7e are operated, it stops and a state is canceled -- upper frame 7b -- Hinges 7c and 7c -- a rotation shaft -- carrying out -- Cylinders 7f and 7f -- pushing up -- it opens up Moreover, the two-place through hole is formed in the predetermined part, and the aforementioned translucent plate 7a is taken as the composition which carries out vacuum adsorption and holds the lower frame board 3(4) every work W and the mask film M, when the adsorption pads 7d and 7d prepared in frame 7b on the above contact this through hole and the lower frame board 3 (4) mentioned later goes up. In addition, seal rubber 7h (refer to drawing 7) is prepared in the periphery by the translucent plate 7a undersurface side. Moreover, as drawing 2 shows, if upper frame 7b opens up, translucent plate 7a can be slid as an arrow shows, and can be taken out easily.

[0063] As drawing 9 shows, the light equipment 9 formed in the housing C for the light sources Electric-discharge lamp 9a and ellipse reflecting mirror 9b reflected so that the irradiation light of this electric-discharge lamp 9a may be condensed, 1st reflecting mirror 9c which reflects the irradiation light from this light equipment 9 at a predetermined angle, It consists of 2nd reflecting mirror 9e which reflects in 9f of parabolic reflectors of the exposure stage B the irradiation light from fly eye lens 9d which prepares the illuminance of the reflected light from this 1st reflecting mirror 9c, and this fly eye lens 9d.

[0064] In addition, it is arranged in the position where only the predetermined distance B shifted to the method of what [right-and-left] from the center of the cross

direction of an aligner 1 as drawing 9 showed (seeing from the direction of Work W in a drawing left-hand side), and the center position of the aforementioned light equipment 9 is *****. And the direction of an axis of the reflected light reflected from the 1st reflecting mirror of the above is parallel to the one-side (one side of side which sends drawing and intersects perpendicularly with feed direction of Work W) side of the work W conveyed, and it is constituted so that it may be located in Work W side from the vertical plane (it displays as center line A-A in drawing 9) formed along with the optical axis perpendicularly irradiated from light equipment.

[0065] Moreover, while the optical axis which the degree of tilt angle of the 1st reflecting mirror is setting it as 25 degrees, and the 1st reflecting mirror reflects in the direction of upper slant is set as 50 degrees, it is constituted so that the angle of the optical axis which carries out incidence to 9f of parabolic reflectors from 2nd reflecting mirror 9e may turn into 50 degrees from perpendicular parallel light, and it becomes easy to install [which is reflected in Work W from 9f of parabolic reflectors / of perpendicular parallel light] it.

[0066] Furthermore, in the housing C for the light sources, the cooling system 16, a roll fan, the refrigerant radiator 18, etc. are formed. Portions other than the frame enclosed with the imaginary line shown by drawing 13 show the composition of a cooling system. The cooling water for cooling etc. is supplied to a cooling system 16 from a ** ON side, in this cooling system 16, it is divided into what cools cooling-system 16 the very thing, and the thing which is sent to a refrigerant radiator side and cools the liquid cooling medium of the refrigerant radiator 18, and the cooling water which finished each cooling work is discharged after that by the cooling system 16. Therefore, as drawing 3 shows, the cooling wind is sprayed on the work side from the roll fan and the refrigerant radiator 18.

[0067] In the aligner of composition of having described above, it operates as follows. drawing 3 shows -- as -- the [the 1st and] -- 2 move table is arranged 12, 13 is arranged on the adjustment stage A and the exposure stage B, respectively, and introduction and an alignment table raise installation table 2a, make the lower frame board 3 separate from on the 1st move table 12 up, and lay the lower frame board 3 on installation table 2a

[0068] next, the end face of Work W is made to contact the salients 3a and 3a of the lower frame 3, and the aforementioned visible parallel ray is carrying out pinpoint irradiation -- Work W is laid so that the positioning mark of Work W may suit by considering a position as a mark on the other hand at least Then, where both the positioning mark of the mask film M is doubled with both the pinpoint irradiation

position of the aforementioned visible parallel ray, the mask film M is laid on Work W. By laying Work W and the mask film M on the lower frame board 3 (4) as mentioned above, it becomes possible to carry out preliminary positioning. It is effective work in order that this preliminary positioning work may do more smoothly the adjustment work mentioned later.

[0069] Next, as drawing 1 shows, the amount of position gaps is computed by dropping Floodlights 6b and 6b and picturizing the positioning mark of Work W and the mask film M with the image pck-up cameras 6a and 6a. Simultaneously, the maintenance mechanism 5 is operated and a mask film is made to estrange from Work W. That is, as drawing 1 and drawing 4 (a), and (b) show, the 2nd driving gear 15 is operated in the descent direction, and the 1st driving gear 14 and the support arm 17 are dropped. As drawing 4 (b) shows, adsorption section 5a which descended with descent of the support arm 17 contacts the mask film M. Under the present circumstances, piece of maintenance 5b resists the energization force of spring 5e, slides up along with slide section 5c, and moves adsorption section 5a to a proper position so that it can absorb the descent distance, even if the descent distance of the 2nd driving gear 15 drops adsorption section 5a caudad across the contact position of a mask film. And the position of adsorption section 5a is fixed by the stopper arm of a stopper supporter operating and carrying out press support of the side edge section of piece of maintenance 5b at the move edge of adsorption section 5a.

[0070] Furthermore, adsorption section 5a which contacted the mask film M does vacuum suction work, and carries out vacuum adsorption of the mask film M. And as drawing 1 and drawing 4 (c) show, the 1st driving gear 14 which is supporting the support arm 17 is operated, and the support arm 17 is raised by small stroke up. If it is made to estrange at this time so that the exposure pattern of the mask film M may not deteriorate by sliding gap from Work W at least, it is sufficient even if the part touches.

[0071] On the other hand, processing operation part etc. processes and calculates the positional information of each positioning mark which the image pck-up cameras 6a and 6a picturized, and the image pck-up meanses 6 and 6 compute the amount of position gaps. And if the aforementioned mask film estranges from a work, each X [of the alignment table 2], Y, and the theta mechanical components 2b, 2c, and 2d will be operated, and the adjustment work of Work W and the mask film M will be done. In addition, the situation of adjustment work is copied out on the monitor 21 shown in drawing 1 . An end of adjustment work lays again the mask film M which the 1st driving gear 14 drops the support arm 17, and is carrying out adsorption maintenance at adsorption section 5a on Work W. Stop Work W and the mask film M to the lower frame

board 3 with fixed meanses, such as an adhesive tape, by the state. Furthermore, while canceling vacuum adsorption of adsorption section 5a, the support arm 17 is raised by the operation of the 2nd driving gear 15.

[0072] And if the alignment table 2 is dropped, the lower frame board 3 on the installation table 2 will descend, will be guided at positioning roller 3a of the move table 12 which is standing by, and 3a—, and installation support will be carried out on the move table 13.

[0073] As for the work W which adjustment work ended, the 1st move table 12 is conveyed by the drive of timing-belt 10e of operation system 10A on the exposure stage B along with linear guide 10a and monotonous guide 10b. Simultaneously with conveyance of this 1st move table 12, the 2nd move table 13 located in the exposure stage B along with linear guide 11a and monotonous guide 11b is conveyed on the adjustment stage A.

[0074] Rise-and-fall table 8a of the perpendicular conveyance table 8 is raised, separation elevation of the lower frame board 3 on the move table 12 is carried out (position of an imaginary line to a solid line), and translucent plate 7a of the upper light transmission frame board 7 is made to contact in the lower part of the 1st move table conveyed on the exposure stage, as drawing 7 shows. And if vacuum adsorption is performed from the adsorption pad 7d [of an upper light transmission frame board], and 7d side, the space surrounded with translucent plate 7a and seal rubber 7h and the lower frame board 3 serves as a vacuum, the up-and-down frame boards 3 and 7 coalesce, and a vacuum frame consists of states where it contacted. Since fixed maintenance of Work W and the mask film M is carried out at the lower frame board at this time, position gap is not caused.

[0075] Then, the light which optical irradiation was performed from light equipment 9, and reached 9f of parabolic reflectors through optical system turns into perpendicular parallel light, and is irradiated by Work W through the mask film M. According to optical irradiation time, such as the kind, for example, a solder resist, and an etching resist, predetermined-time irradiation of the work exposed is carried out. After exposure of Work W is completed, vacuum adsorption of the upper light transmission frame board 7 is canceled, and since the lower frame board 3 is released from the upper light transmission frame board 7, it descends with descent of rise-and-fall table 8a, and is guided and supported by positioning rotation roller 12a of the move table 12 which is standing by.

[0076] On the other hand, during the exposure work of Work W, as described above, the adjustment work of other works W is done on the adjustment stage A. And after

exposure work and adjustment work are completed, respectively, installation support is carried out at each move table 12 and 13, and between [A and B] each stage are conveyed according to the conveyance mechanisms 10 and 11. As drawing 8 shows the lower frame board 4 conveyed on the 2nd move table 13, like the above, with elevation of rise-and-fall table 8a of the perpendicular conveyance table 8, the lower frame board 4 dissociates from the move table 13, and it is laid in rise-and-fall table 8a, and goes up, contact coalesce is carried out with the upper light transmission frame board 7, a vacuum frame is constituted, and exposure work is done. Thus, the exposure work of Work W is done one by one by repeating said adjustment work, conveyance work, and exposure work, and performing them.

[0077] In addition, as drawing 10 shows, you may attain the fixed means of the above-mentioned work and a mask film by considering as the composition of the lower frame board 33. That is, it becomes possible to carry out vacuum adsorption and to hold Work W and the mask film M on the lower frame board 33, by carrying out vacuum suction, from the connection hose which prepared hole 33for suction b, and 33b— in the upper surface of the move table 33, and was prepared in the lower part side of the lower frame board 33. In addition, most forms the through hole and Work W becomes that this through hole to the mask film M can carry out suction maintenance.

[0078] Moreover, although the above-mentioned maintenance mechanism is considered as the composition which can perform movement for adjustment of Work W convenient even if it does not make the mask film M estrange completely from Work W, when it is necessary to make the mask film M estrange from Work W completely and is composition as shown by drawing 11 , it is convenient. That is, two or more adsorption section 35a (a drawing every three pieces) is attached in the support arms 37 and 37 free [vertical movement] through attachment section 35b, and it constitutes so that adsorption section 35a may always be energized by spring-member 35c at a mask film side. Furthermore, each stopper arm 35d which carries out fixed support is made to correspond to each adsorption section 35a, and is prepared in the predetermined move position of adsorption section 35a. And a rotation shaft is set as the base side of the aforementioned support arms 37 and 37, and suitably, as an arrow shows, it does not matter as composition which can be rotated right and left.

[0079] Furthermore, composition of the aforementioned light equipment is not cared about as composition which irradiates a work from a direct electric-discharge lamp. When using this direct solar radiation, as drawing 12 shows, it is considering as the composition which adjoins behind an exposure stage, prepares HAUNJIGU for cooling,

and forms a cooling system 16, a roll fan, the refrigerant radiator 18, etc. in the interior. Moreover, the cooling means of a electric-discharge lamp is made into liquid cooling, and a electric-discharge lamp is not cared about as composition cooled by the coolant directly or indirectly. In this case, as drawing 13 shows, the liquid cooling means 34 has sent out the liquid from liquid cooling radiator 34a of the coolant object through which it circulates, fluid liquid cleaner 34b which washes the liquid cooled by this liquid cooling radiator 34a, cistern 34c which stores water in the washed liquid, and this cistern 34c to light source section 34e through pump 34d. And the cooling medium of the aforementioned liquid cooling radiator 34a is cooled with 34f of cooling objects established along with liquid cooling radiator 34a by cooling media, such as water supplied from the ** ON side. In addition, it is convenient, when time will use this electric-discharge lamp and it is the composition which prepares shutter 34c which interrupts the optical irradiation from a electric-discharge lamp, by the time it switches on the light.

[0080] Moreover, the above-mentioned transport device is sent instead of a linear guide and a starting device, uses a screw mechanism, and prepares the attaching part which screws and moves to the delivery screw at the end side of a move table, and it is available for it to carry out the rotation drive of the delivery screw also as composition which conveys a move table. In this case, it is forming a delivery screw between exposure stages from 2 adjustment stage up and down, and preparing one mechanical component which rotates an up-and-down delivery screw to right-and-left opposite direction, and it becomes possible to convey a move table on an exposure stage and an adjustment stage by turns.

[0081] Furthermore, the thing which the guide prepared in the move table is considered as a fixed guide, and is considered as the composition which forms a curved surface in the portion which contacts the side of a lower frame board, Even if the lower frame board has shifted somewhat by preparing a taper portion, it considers as the composition which is guided at a taper portion and can carry out installation support in a proper position, It does not matter as composition which prepares so that the surface of revolution of a rotation roller may project on each side of a lower frame board, and prepares the fixed guide to which it is shown to each rotation roller of these bottom frame board in a move table side.

[0082] And it is the aligner of the above-mentioned composition adjoining and putting two sets side by side, installing one light equipment in housing for the light sources in the center, enabling rotation of the composition of the 1st reflecting mirror which reflects in a predetermined angle the irradiation light of the perpendicularly it

irradiates from light equipment, and considering as the composition which prepares each reflecting mirror reflected in the parabolic reflector prepared in the exposure stage, and it is good also as composition set and expose the work of an exposure stage on either side in time difference. Moreover, an aligner is connecting two sets to lengthwise with the composition which shares housing for the light sources, and the 1st reflecting mirror's rotating, and changing the optical direction of radiation 360 degrees, and is not cared about as composition which sets time difference and exposes the work of the exposure stage of one side and another side.

[0083]

[Effect of the Invention] As stated above, this invention demonstrates the effect which was excellent in the degree.

(1) The adsorption section which the support arm changes the distance of a stroke with the 1st driving gear and the 2nd driving gear, and the maintenance mechanism in which a mask film is held moves up and down, and carries out vacuum adsorption of the mask film is the move edge, and fixed support is carried out with a stopper supporter. Therefore, it corresponds, even if the adjustment work of a work and a mask film is easy and the thickness of a work differs, and adjustment work can be performed exactly.

[0084] (2) Since it is constituted so that it may be energized by the elastic member at a mask film side, the adsorption section contacts a mask film more certainly and the aforementioned adsorption section becomes possible [carrying out adsorption maintenance], when a support arm is descended with the 1st driving gear.

[0085] (3) The move table horizontally conveyed by turns along an up-and-down conveyance way prepares a positioning guide in the predetermined position of an installation board, and is carrying out installation support of the lower frame board along with the positioning guide. Therefore, if each alignment table and perpendicular conveyance table installed in the adjustment stage and exposure stage which are the move edge of one side of a move table and another side go up across an up-and-down conveyance way, it dissociates from a move table, and a lower frame board will be laid in each table, and will carry out elevation alienation. Moreover, if each table which is laying the lower frame board descends, a lower frame board will be guided at the positioning guide of a standby ***** move table, and installation support will be carried out on a move table. Therefore, the automatic negotiation and automatic exposure of a work and a mask film are made possible, and the throughput of a work improves.

[0086] (4) The positioning guide which carries out installation support of the lower

frame board of a move table is using a rotation roller, and makes it possible to guide a lower frame board at the rotation roller, and to carry out installation support of the lower frame board more smoothly at a move table, and to dissociate from a move table.

(5) By the upper part side of a mask film, along with the longitudinal direction of a move arm, that it can move, since the end face of a move arm can move to a level slot, the supporter material of an image pick-up camera does not need to establish a drilling hole in a work, and the image pick-up means prepared in the adjustment stage enables adjustment work corresponding to the size of a work. Moreover, since a lighting system irradiates lighting light by the move soffit when an annular lighting system is prepared free [vertical movement] and picturizes the positioning mark of a work and a mask film with the aforementioned image pick-up camera, the aforementioned supporter material can picturize a positioning mark exactly.

[0087] (6) A work doubles and lays the positioning mark of a work in the visible parallel light which carries out pinpoint irradiation of the predetermined position of a lower frame board while end-face doubling of the end side is carried out to the salient prepared in each lower frame board and it installs it in it. And in case a mask film is laid on a work, it becomes possible to carry out temporary positioning by doubling the positioning mark of a mask film and putting the pinpoint irradiation position of the aforementioned visible parallel light on a mark.

[0088] (7) Since the reflecting mirror which reflects the light irradiated from the electric-discharge lamp of light equipment in the predetermined direction, the fly eye lens which adjusts the illuminance of light are prepared in housing of the light equipment adjoined and formed in the exposure stage while forming an air-cooling device, the humidity in housing and the luminescence heat from a electric-discharge lamp are removed preferentially. Moreover, while forming light equipment in housing for the light sources contiguous to an exposure stage and shifting and installing light equipment in the method of what [right-and-left] from the center position of the right-and-left cross direction of an aligner Since the 1st reflecting mirror reflects the irradiation light from light equipment in a predetermined angle at a work side from the vertical plane which is parallel to the end side of a work, and is constituted along with the optical axis of the irradiation light of the perpendicular direction from light equipment, While the proper distance which irradiates perpendicular parallel light is securable for a work, it makes small [of an aligner] possible.

[0089] (8) the adjustment method which described the work and the mask film above -- the support from a move table -- quick adjustment work can be performed by doing adjustment work on the lower frame board formed free [alienation]

(9) Moreover, when coalescing under conveyance and in an upper light transmission frame board by the conveyance method of the above-mentioned work, since fixed maintenance is carried out by the fixed means at the lower frame board, a work and a mask film do not cause position gap. Moreover, adjustment work and exposure work, and conveyance work can be quick, and it can carry out exactly.

(10) The exact exposure work [be / no position gap] of the work and mask film by which fixed maintenance was carried out on the lower frame board is further attained by the exposure method of the above-mentioned work.

[Translation done.]